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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/648,918	08/25/2000	Peter K. Cheo	PC-12	7311

7590

05/09/2002

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EXAMINER

NGUYEN, TUAN M

ART UNIT

PAPER NUMBER

2828

DATE MAILED: 05/09/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/648,918

Applicant(s)

CHEO ET AL.

Examiner

Tuan M Nguyen

Art Unit

2828

-- Th MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.


- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.


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Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a) because they fail to show outer cladding (23), referring to fig 1 and the fig 42, note col. 9 line 1 as described in the specification. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-2, 4, 5, 8, 9, 11-16, 18-21 are rejected under 35 U.S.C. 102(b) as being anticipated by Cheo (US Patent 6,031,850).

With respect to claims 1, 2, 14 Cheo disclose clad pumped, eye-safe and multi-core phase-locked fiber lasers comprising a fiber laser (10), fiber core (11), inner cladding (12), outer cladding (13), protective coating (14), a pair of mirrors (17, 18), radiation (20), see figs 1 and 2. Cheo principal object is provision of high power, eye-safe, clad-pumped, fiber laser. Other objects of the invention include phase-locked, multi-core, clad-pumped, fiber laser emitting the fundamental, in-phase supermode with its entire power confined in a single, high-brightness beam spot, and improvements in high power, co-doped, rare earth ion clad-pumped fiber lasers, note col. 2 lines 13-19. Cheo also discussed a clad pumped fiber laser having a

Art Unit: 2828

single core, lasing ions, the gain, cross sectional, the radiation, and an isometric matrix of doped cores equally spaced with one another by a center-to-center distance of not less than two core diameters, within a common inner, pump cladding and mirrors forming a cavity with a finesse of at least ten, providing a single, phase-locked high brightness output in the fundamental supermode, note col. 2 lines 40-67.

With respect to claims 3, 19 Cheo discussed the core having diameter of 7 μm , the center-to center distance between each core is about two core diameters, which in this example is about 14 μm which is interpreted as close or approximate to 15 μm range as recited in the claim , note col. 5 lines 20-26.

With respect to claim 4, Cheo discussed pump cladding is circular , note col. 6 lines 56-57,

With respect to claim 5, Cheo discussed pump cladding is circular, note col. 4 lines 38-44.

With respect to claims 7, 15 Cheo discussed clad pumped fiber laser having a single core, note col. 2 lines 40-41.

With respect to claims 8, 9 Cheo discussed arranged isometrically in at least one ring of six cores surrounding central core , note col. 5 lines 41-49, see fig 4.

With respect to claim 11, Cheo discussed the index of refraction , note col. 3 lines 46-51

With respect to claim 12, Cheo discussed a plurality of cores and characteristic is gain, note col. 5 lines 64-67, col. 6 lines 1-4 and col. 4 lines 45-53.

With respect to claim 13, Cheo discussed a plurality of cores is cross sectional dimension , note col. 5 lines 28-33

With respect to claim 16, Cheo discussed a plurality of cores with substantially the same cross sectional area as each other, note col. 6 lines 10-12, see fig 4.

With respect to claim 18, Cheo discussed about multi-cores, phase-lock and transfer laser power coherently into a bright laser beam of the fundamental in-phase supermode from all high order supermodes belonging to the same array structure, note col. 4 lines 62-67 and col. 5 lines 1-19.

With respect to claim 21, Cheo discussed the core is rectangular, note col. 18 line 44.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 6 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cheo (US patent 6,031,850) in view of Islam (US patent 6,052,393).

With respect to claim 6, Cheo have been discussed as above ,except for linearly polarized output laser beam. Whereas Islam disclose broadband sagnac raman amplifiers and cascade lasers. Islam discussed techniques to create the polarization diversity pumping and the polarization independent gain property is highly desirable for most applications, note col. 18 lines 16-51. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have linearly polarized, cladding pump source, rare earth lasing ions and gain as suggested or taught by Cheo and Islam combined.

Art Unit: 2828

With respect to claim 10, Cheo has been discussed above, except for a first ring of six cores surrounding said central core and a second ring of twelve cores surrounding said first ring. However Cheo discussed the arranged in an isometric matrix having three rings and 37 cores, note col. 5 line 67 and col. 6 line 1. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the first ring of six cores surrounding the central core and second ring of twelve cores surrounding the first ring, since it has been held that discovering an optimum value of a result effect variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cheo (US patent 6,031,850) in view of Ventrudo et al (US patent 6,041,072).

With respect to claim 17, Cheo have been discussed as above, except for a plurality of cores with substantially the same refractive index. Whereas Ventrudo disclose apparatus for stabilizing multiple laser source and their application. Ventrudo discussed a fiber Bragg grating is a periodic structure if the refractive index variation in or near the guide-mode region of the optical fiber that can reflect light of a predetermined narrow bandwidth propagating along the fiber, note col. 4 line 22-49. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have refractive index, cladding pump source, rare earth lasing ions and gain as suggested or taught by Cheo and Ventrudo combined.

Citation Of The Pertinent References

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclose.

The patent to Zhang (US patent 6,373,868 B1) disclose single-mode operation and frequency conversions for diode-pumped solid-state lasers comprising beam expander (23), internal non-linear crystal (27), cavity mirrors (21,22), second harmonic output (20) and fundamental radiation (19).

The patent to Islam (US patent 6,370,164 B1) disclose broadband sagnac raman amplifiers and cascade lasers comprising amplifier (20), two reflectors (22, 24), light source (26) WDM port (28) , see fig 2.

The patent to Ball et al (US patent 6,031,849) disclose high power three level fiber laser and method of making same comprising radiation (10), ground state (12), excited state (14), upper level lasing (16), see fig 1.

The patent to Ventrudo et al (US patent 5, 841, 797) disclose apparatus for stabilizing multiple laser sources and their application comprising laser diodes (11, 12), divergent emission (13, 14), delivery systems (15,16), output (17, 18), beam combiner apparatus (19). See fig 1.

Art Unit: 2828

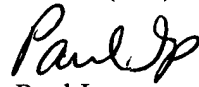
Communication Information

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tuan M Nguyen whose telephone number is (703) 306-0247.

The examiner can normally be reached on 8am to 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Ip can be reached on (703) 308-3098. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 306-5511 for regular communications and (703) 306-5511 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 306-3329.


Paul Ip
SPE
Art unit 2828

TMN
April 24, 2002